December 16, 2011
Project No. 603668001

Mr. Abdul Rashid, PE, CFM
City of Casa Grande
3181 North Lear Avenue
Casa Grande, Arizona 85222

Subject: Landfill Scale and Scalehouse
Northwest Corner of Interstate 8 and Chuichu Road
Casa Grande, Arizona

Dear Mr. Rashid:

In accordance with our revised proposal dated December 5, 2011, and your authorization, Ninyo & Moore has performed geotechnical services for the above-referenced site (Figure 1). This letter presents the methodology and recommendations for the design of the project.

SCOPE OF SERVICES

The scope of our services for the project generally included:

- Marking out the boring locations and notifying Arizona Blue Stake of the locations prior to drilling. The approximate location of the borings is presented on Figure 2.
- Drilling, logging, and sampling two exploratory soil borings to a depth of 10 feet below ground surface (bgs). The boring logs are presented on Figures 3 and 4.
- Preparing this letter presenting the recommendations pertaining to the allowable bearing capacity of the shallow foundations.

FIELD EXPLORATION

On December 12, 2011, Ninyo & Moore conducted a subsurface evaluation at the site in order to assess the existing subsurface conditions. Our evaluation consisted of the drilling, logging, and sampling of two exploratory borings within the footprint of the proposed scale. The borings were advanced using a CME-55 truck-mounted drill rig equipped with hollow-stem augers, and extended to approximately 10 feet bgs. Bulk and relatively undisturbed soil samples were collected at selected intervals. The general locations of the borings are shown on the Boring

Location Map (Figure 2). Detailed descriptions of the soils encountered are presented on the boring logs on Figures 3 and 4.

Based on our soil borings, fill was encountered and extended to the total depth explored. The fill generally consisted of a dense to very dense, clayey sand and silty sand in our borings. Asphalt debris was encountered in one of our borings within the fill material.

FOUNDATIONS

We recommend utilizing spread or continuous footings for this project. Spread or continuous footings should be supported at a depth of 18 or more inches below the adjacent grade on a 3-foot zone of engineered fill that extends below the bottom of the footing. The engineered fill should be moisture conditioned and compacted to 98 percent relative compaction per ASTM D 698.

Following the excavation, and prior to placement of fill, the surface should be exposed for any soft or wet areas, and any debris. Additional overexcavation may be needed if encountered.

Spread footings should have a width of 16 or more inches, and isolated column footings should have a width of 24 or more inches. Column or continuous footings should be reinforced in accordance with the recommendations of the structural engineer. Footings may be designed using an allowable bearing pressure of up to 2,000 pounds per square foot (psf) for static conditions.

Total and differential settlement of up to about ½-inch and ¼-inch, respectively, may occur. Distortions of about ¼-inch (vertical) over 20 feet (horizontal) are possible. Because the site has been historically used as a landfill, additional settlement may occur due to debris in the subsurface.

Foundations bearing on moisture-conditioned, re-compacted material and subject to lateral loadings may be designed using an ultimate coefficient of friction of 0.35 (total frictional resistance equals the coefficient of friction multiplied by the dead load). A passive resistance value of 300 psf of depth can be used. The lateral resistance can be taken as the sum of the

frictional resistance and passive resistance, provided that the passive resistance does not exceed one-half of the total allowable resistance. The passive resistance may be increased by one-third when considering loads of short duration such as wind or seismic forces. The foundations should preferably be proportioned such that the resultant force from the loads, including lateral loads, fall within the kern (i.e., middle one-third of the footing base).

LIMITATIONS

The engineering services described in this report have been conducted in general accordance with current practice and the standard of care exercised by engineering consultants performing similar tasks in the project area. Variations may exist and conditions not observed or described in this report may be encountered. No warranty, expressed or implied, is made regarding the conclusions and opinions presented in this report. Our conclusions are based on an analysis of the observed site conditions and our engineering judgment. If actual conditions differ from those described in this report, our office should be notified. We reserve the right to offer additional opinions in the future.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE

Jeffrey S. Rodgers, RG
Project Geologist

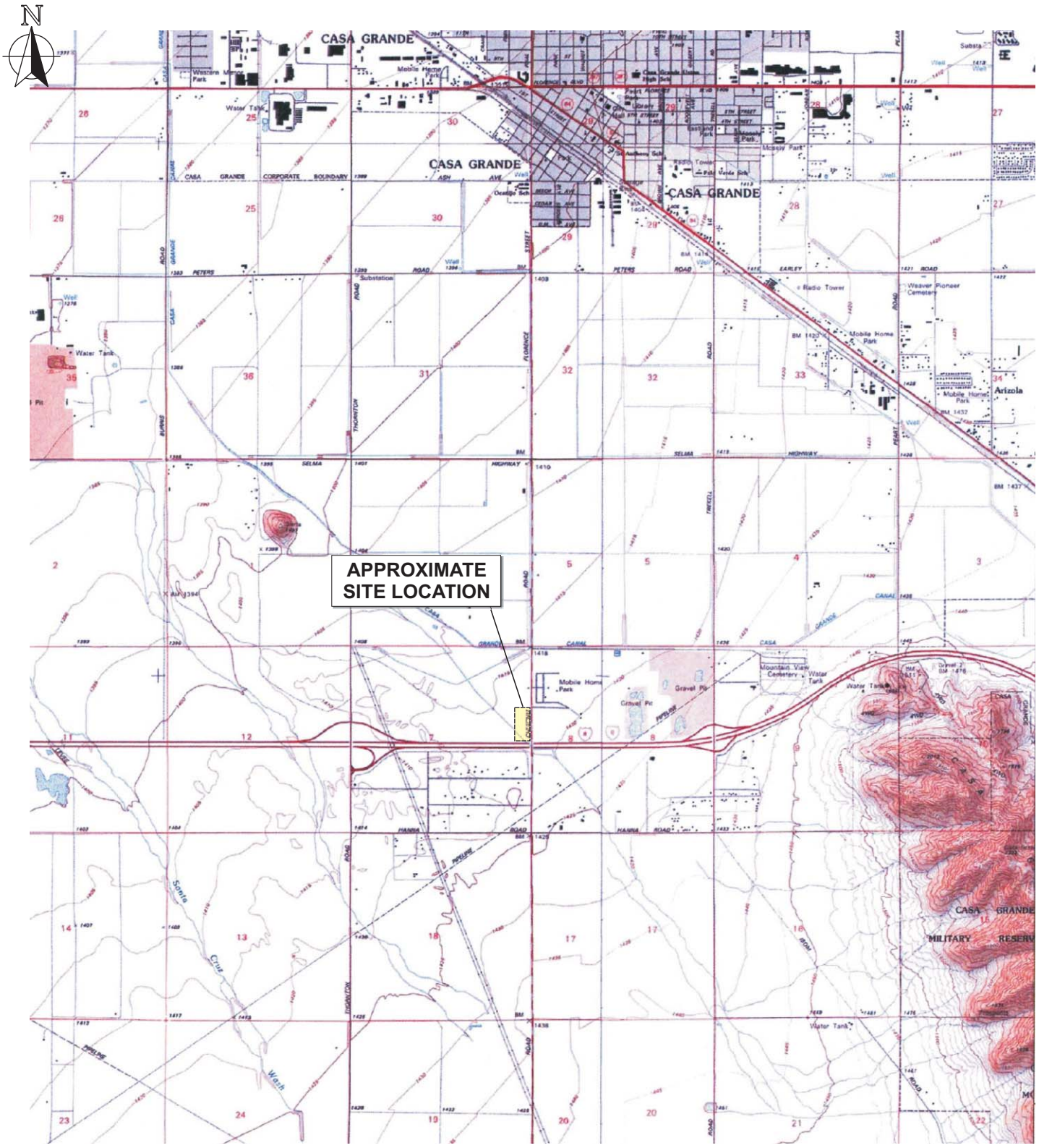
EXPIRES 3/31/12

Kevin L. Porter, PE
Senior Engineer EXPIRES 12/31/13

JSR/KLP/clj

Attachments: Figure 1– Site Location
Figure 2 – Boring Locations
Figures 3 and 4 – Boring logs

Distribution: (1) Addressee – Electronic Copy



Source: US Geological Survey 7.5-minute topographic map, Chuichu, Arizona, 1992.

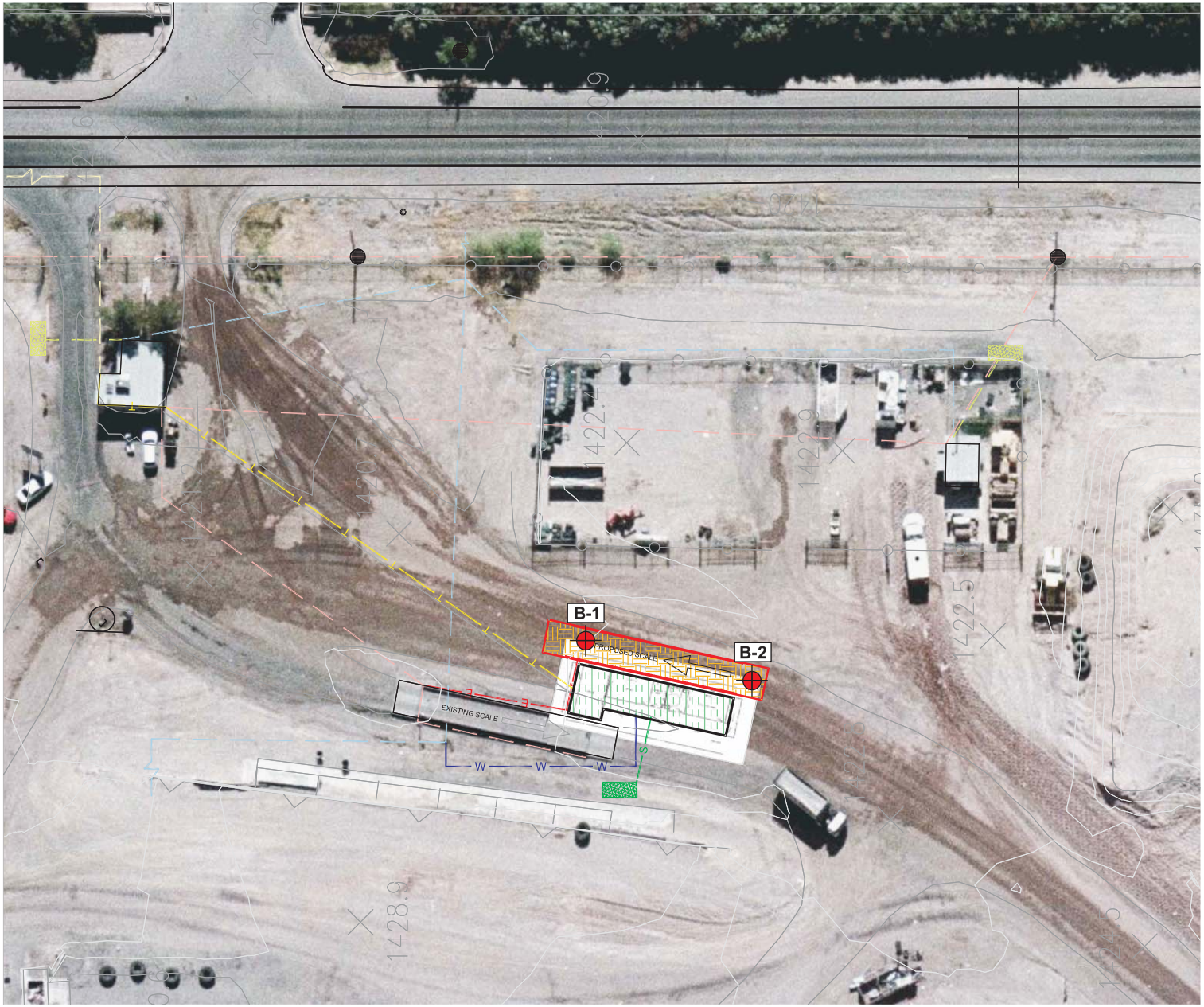
0 4000

Approximate Scale:
1 inch = 4000 feet

Note: All dimensions, directions, and locations are approximate.

Ninyo & Moore		SITE LOCATION	FIGURE 1
PROJECT NO: 603668001	DATE: 12/11	LANDFILL SCALE AND SCALEHOUSE NORTHWEST CORNER OF INTERSTATE 8 AND CHUICHU ROAD CASA GRANDE, ARIZONA	

file no: 3668vmap1211



LEGEND

- SCALE
- SCALE HOUSE
- *EXISTING ELECTRIC
- *EXISTING WATER
- *EXISTING TELEPHONE
- *EXISTING SEPTIC/SEWER
- PROPOSED ELECTRIC
- PROPOSED WATER
- PROPOSED SEPTIC/SEWER
- PROPOSED TELEPHONE
- PROPOSED EMPTY CONDUIT
- B-2 BORING LOCATION

*LOCATIONS ARE APPROXIMATE. CONTRACT IS TO VERIFY.

NOT TO SCALE

Note: Dimensions, directions, and locations are approximate.

Ninyo & Moore	BORING LOCATIONS	FIGURE
PROJECT NO: 603668001 / DATE: 12/11	LANDFILL SCALE AND SCALEHOUSE NORTHWEST CORNER OF INTERSTATE 8 AND CHUICHU ROAD CASA GRANDE, ARIZONA	2

file no: 3668sp1211

DATE DRILLED 12/12/11 BORING NO. B-1

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-55, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	FILL: Brown, damp, very dense, clayey SAND.
		93/9"					
		26					Dense; scattered caliche nodules.
5							
		82					Very dense; numerous caliche nodules.
		42					
10							Total Depth = 10 feet. Groundwater not encountered during drilling. Backfilled on 12/12/11 promptly after completion of drilling. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
15							
20							

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BORING LOG

Casa Grande Landfill Scale & Scalehouse
Casa Grande, Arizona

PROJECT NO.	DATE	FIGURE
603668001	12/11	3

DATE DRILLED 12/12/11 BORING NO. B-2

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-55, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		50/5"				SM	FILL: Dark brown, damp, very dense, silty fine to coarse SAND; scattered asphalt debris.
5		68				SC	Brown, damp, dense, clayey SAND; scattered caliche nodules.
		73					Very dense.
		50/5"					Numerous caliche nodules.
10							Total Depth = 8.9 feet. Groundwater not encountered during drilling. Backfilled on 12/12/11 promptly after completion of drilling. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
15							
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Ninyo & Moore

BORING LOG

Casa Grande Landfill Scale & Scalehouse
Casa Grande, Arizona

PROJECT NO.	DATE	FIGURE
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